Welcome!

Blow the Cobwebs out of your local museum & science center!

BOOST Conference,
Friday, May 3, 2013
1:15pm - 2:30 pm

Hosted by Community Initiatives-
Center for Advancement of
Science Education

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chicago

Agenda

- 1:15 pm Welcome!
- 1:35 pm Science Minors/Achievers
  - *Bed of Nails*
- 1:50 am Science Clubs
  - *Sound Sandwich*
- 2:15 pm
  - Wrap up/ Questions/Giveaways

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How to prep for a museum visit:

Steps prior to your arrival:

-**pre-plan and pre-purchase group tickets** (consider scholarship programs, i.e. Museum of Science-Boston)

-**transportation** (some institutions will provide this– Museum of Science and Industry-Chicago)

-**apparel** (an interactive museum might mean a messy experience at times... dress comfortably/walking shoes)

-**basic terminology for students** (What does a museum do? What types of museums are there?/ Create a crash course for your students by having them curate a "mini-museum" of items/ hobbies that are important to them)

Exploring Museum Education Departments:

-several institutions have **corresponding curriculum to state standards** that are easy to search/build field trips based around standards (Smithsonian/MSI/ Pacific Science Center aligned with Washington State Core Standards)

-**learning labs** (California Science Center– 32,000 sq. ft. space dedicated to independent learning labs/California Academy of Science—Orthopedic Surgery/Knee Replacement live)

-**museum workshops** are plentiful at many institutions/check in with a contact person via phone through their education department for scheduling (one time only/year long partnerships)

-always inquire about **summer camps and overnight/"snoozeum"** opportunities

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How to prep for a museum visit:

Helpful Hints:

-**Find a friend!** Pick up the phone and speak with a contact person within the institution's education department

-**Use technology** to book your trip and prep your kids. Apps or citizen science opportunities are a great way to engage your students prior to and during your trip to a science center. Check into apps through MSI/Museum of Natural History/Museum of Science-Boston/California Science Center).

-**Set-up reasonable expectations**... Rome wasn't built in a day and you won't see everything in three hours!

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Science Minors
&
Achievers

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Science Minors & Achievers

Science Minors…

- teens learn about science,
- make friends,
- meet science professionals and conduct experiments with Museum guests while fulfilling service learning hours.
- 10 weeks of science education and training by Museum staff and external scientists, then volunteer to conduct interactive science experiments for Museum guests.
- Science Minors gain a better understanding of science, a first-hand look at science careers, and public speaking skills. Since 2003, more than 600 Science Minors have contributed over 100,000 hours of volunteer service.

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Science Minors & Achievers

Science Achievers…

- teens can discover new interests in science and technology,
- develop leadership skills,
- prepare for college and careers,
- learn from working science professionals,
- mentor new classes of Science Minors,
- and have the opportunity to participate in paid internships.
- Teens become more comfortable with science and understand its impact on their lives by engaging Museum guests in activities.

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Activity 1: *Bed of Nails*

Objective: *Students will*:

- understand the relationship between pressure, force and area.
- use the principle of force per unit area to explain how its possible for a balloon to rest securely on a bed of nails without bursting.
- be able to present the “Bed of Nails” activity.

Materials:

- Bed of Nails Unit
- Set of Metric Masses
- Bag of 5 inch Latex Balloons

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Activity 1: *Bed of Nails*

What to do?

1. Center the board with nails on the base-board-board (board equipped with 2 vertical posts).

2. Carefully place one inflated balloon onto the bed of nails.

3. Place the “floating” board (board with 1 hole at each end) through the posts of the base-board, and gently rest it on top of the balloon.

4. Carefully place a 500 g mass at the center of the “floating” board. **Make sure board is not significantly tilted as heavy mass may topple and cause injury.**

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Activity 1: *Bed of Nails*

What is Happening?

- Each nail corresponds to one point of contact on the inflated balloon.
- **The more points of contact there are, the smaller the force is at each point**.
- With more nails, the force from the weight of the mass is spread out over a larger surface area of the balloon and none of the nails can exert enough force to puncture the balloon.

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Activity 1: *Bed of Nails*

Questions to think about….

· What will happen to the inflated balloon if you remove all but a few nails?

· What would happen if you were to continue to increase the weight on the inflated balloon?

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Science Minors Clubs

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Science Minors Clubs

Science Minors Clubs…

- Aim to increase interest in science in underserved neighborhoods by engaging students at community-based organizations and their schools. Participants work together on projects and activities that build curiosity and encourage teamwork.
- The Science Minors Club network consists of over 72 locations in Chicago, its suburbs, and Northwest Indiana and has the capacity to serve upwards of 5,000 youth each year.
- The four tiers - **Associates**, **Partners**, **Masters** and **Ambassadors** - that provide differing levels of support. The tiered approach is designed to give sites the confidence and skills they need to provide science experiences on their own.

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Activity 2: *Sound Sandwich*

Objective: Using a variety of materials, participants will create, experience, and investigate sound. They will also explore pitch by changing the length of a sound wave and explore amplitude by changing the size of a sound wave.

Materials:

- 2 Jumbo Craft Stick
- 1 Straw
- 1 Wide Rubber Band (#64)
- 2 Smaller Rubber Bands (#32)

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Activity 2: *Sound Sandwich*

What to do:

1. Place a wide rubber band lengthwise over **one** craft stick.

2. Cut 2 small pieces of straw, each about 1 inch to 1 1/2 inches in length.

3. Tuck 2 straw pieces underneath the rubber band, slide one straw towards each end of the craft stick (about 1 inch from the end).

4. Place another craft stick on top of the straws, like the top piece of bread on a sandwich.

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Activity 2: *Sound Sandwich*

What to do (cont.)…

5. Wrap a smaller rubber band around both of the craft sticks on one end of the sandwich, to hold them in place. Use another rubber band to do the same on the other end. The rubber bands should pinch the 2 craft sticks together and there should be a small space between the two craft sticks created by the two pie of straw.

6. Hold the Sound Sandwich up to your mouth and blow through the space between the sticks. What happened? What did it feel like?

7. Try moving the straws closer together and blow through the middle of the sandwich again. Did moving the straws change anything?

Activity 2: *Sound Sandwich*

What is Happening?

When you blew through the Sound Sandwich, could you feel it vibrating against your lips? You just felt sound!

Sound is produced when a vibration is transmitted through a solid, liquid, or gas.

When you blew air through the space between the craft sticks, that air caused the rubber band to vibrate (move up and down quickly) between the two craft sticks. That vibration produces a sound.

Activity 2: *Sound Sandwich*

What is Happening?

Sound moves just like the rubber band, up and down in a wave.

Sound waves can have different lengths, and different wavelengths resulting in different sounds.

When the straws were placed closer together, the part of the rubber band that vibrates is shortened and moves more quickly, resulting in a higher pitched sound.

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Wrap- up:

Adaptations:

- Have you done these activities before?
- What would you do differently to fit the needs of your students?
- How would you extend the activities?

How much will it cost?…

	Sound Sandwich	
ITEMS	***QUANTITY***	***COST***
Jumbo Craft Sticks Color sticks-	1 box of 600 1 box of 500	$6.95 $8.40
Small Rubber Bands Size 32	1 box of 820	$11.79
Wide Rubber Bands Size 64	1 box of 320	$11.79
Plastic Straws	1 box of 1000	$12.20
Total		

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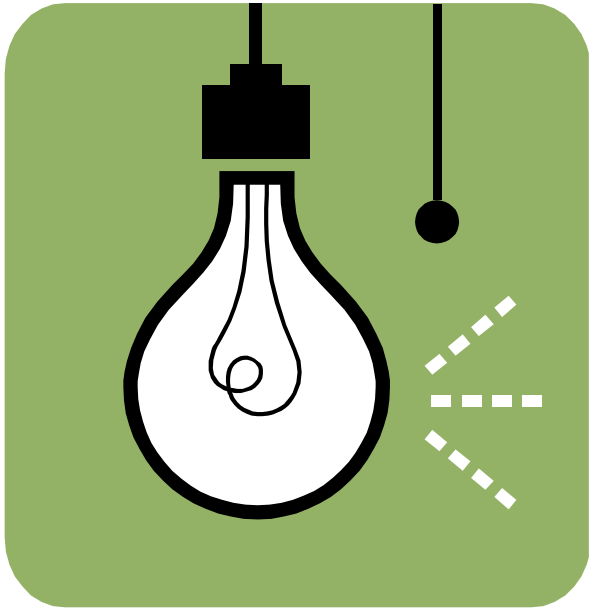
Giveaways!!!

Electricity in a Bag!



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Questions?

Other fun hands-on activities can be found online:

http://www.msichicago.org/online-science/activities/

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Thank You!!!

Regina Cavazos
Regina.cavazos@msichicago.org
Marilyn Cosby
marilyn.cosby@msichicago.org
Maggie Goodman
maggie.goodman@msichicago.org

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Thank You!!!

Angelina Mandoza
Angelina.mendoza@msichicago.org
Marvin McClure
marvin.mcclure@msichicago.org

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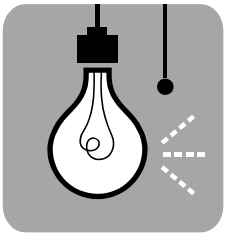
Exploring Electricity

Lesson: Electricity in a Bag



How does electricity travel?

Objective: Participants will explore electricity by creating a simple circuit and will experiment with different materials to determine which allow electricity to flow (**conductor**) and which do not (**insulator**).

Materials:

- AA Battery
- Holiday Light
- Bag of Various Items
- Pencil

Challenge*:* *Can you light the light bulb with only the materials provided?*

What To Do:

- Complete the following chart to record the materials that allowed the light bulb to light and the materials that did not.
- Draw a picture of one of the circuits you created to light the light bulb in the box below.

Material	Allowed the bulb to light	Did not allow the bulb to light
Shell		X

Sound Sandwich

Lesson: Let's Make Some Noise!

What is sound?

Objective: Participants will have a hands-on experience creating a noisemaker to investigate sound. Participants will explore pitch and amplitude by changing the length and size of a sound wave.

Materials:

- Tongue Depressor (2)
- #32 Rubber band (2)
- #64 Rubber Band
- Straw
- Scissors

What To Do:

1. Place a wide rubber band lengthwise over <u>one</u> craft stick.
2. Cut 2 pieces of straw, each about 1 1/2 inches in length.
3. Tuck the straw pieces underneath the rubber band and slide one straw towards each end of the craft stick (about 1 inch from the end).
4. Place another craft stick on top of the straws, (like the top piece of a sandwich).
5. To hold your Sound Sandwich in place, wrap a smaller rubber band 4 times around one end of the craft sticks. Use another rubber band to do the same on the other end. The rubber bands will pinch the 2 craft sticks together and there will be a small space between the two craft sticks created by the two pieces of straw.
6. Hold the Sound Sandwich up to your mouth. Put your lips on your Sound Sandwich and blow through the space between the sticks and the straws.
7. Try moving the straws closer together and blow through the middle of the sandwich.

What's Happening: When you blew through the Sound Sandwich, how did it feel vibrating against your lips? You just felt sound! Sound is produced when a vibration is transmitted through a solid, liquid or gas. When you blew air through the space between the craft sticks, that air caused the rubber band to vibrate (move up and down quickly) between the two craft sticks. That vibration produced sound. Sound moves just like the rubber band, up and down in a wave. Sound waves can have a variety of lengths and different wavelengths result in different sounds.